



Photocredit: Northern Power Systems/Pix16730

The City of Medford, Massachusetts owns a Northern Power Systems Northwind 100 wind turbine sited at McGlynn Elementary & Middle School.

Wind for Schools Affiliate Programs

The U.S. Department of Energy's (DOE's) Wind for Schools program is designed to raise awareness about the benefits of wind energy while simultaneously developing a wind energy knowledge base in future leaders of our communities, states, and nation. To accommodate the many stakeholders who are interested in the program, a Wind for Schools affiliate program has been implemented. Individual K-12 schools or states that join the affiliate program will not receive financial support from DOE and the National Renewable Energy Laboratory (NREL), but they will receive access to technical assistance, program Web sites, and information. The program is designed to support schools that wish to implement wind-related educational curricula and install a Wind for Schools wind turbine system or states that intend to implement a statewide program.

In both cases, a key element of the program is to install small wind turbines at K-12 schools to be used in combination with age-appropriate, hands-on, wind-related curricula taught in science classes. The standard Wind for Schools system is further described in the Wind for Schools Project Power System Brief (available at www.nrel.gov/docs/fy09osti/45685.pdf), but the system can include other turbines if appropriate. State-

based programs would support the implementation of a Wind Applications Center (WAC) at a local engineering university or college to lead efforts to implement Wind for Schools systems at multiple state K-12 schools.

The two affiliate programs are described in detail below.

Individual K-12 Wind for Schools Affiliate Program

The K-12 Wind for Schools affiliate program is designed to support the implementation of an education program at a K-12 school with staff interested in incorporating wind energy into existing educational programs.

Program Support

Although the DOE's Wind for Schools program will not provide monetary support to an affiliate K-12 program, it will provide support in other areas. As a Wind for Schools K-12 affiliate, a school's staff will gain access to:

- Project implementation documents, including interconnection specifications and foundation information

- Hardware and software developed for the Wind for Schools system at costs equivalent to those paid by other Wind for Schools host schools
- Limited technical assistance during the implementation of the Wind for Schools system
- Program-sponsored teacher-training programs
- The Wind for Schools host schools' system database to support expanded educational opportunities
- The Wind for Schools environmental benefit sales process to allow the affiliate school to obtain outside funding to support the system implementation
- The National Energy Education Development (NEED) Project's curricula kits on a short-term loan basis to enable schools to complete the full NEED curricula model (as available).
- Install a Skystream (or equivalent) wind turbine at the school and utilize specific hardware (approved as appropriate for any state incentives)
- Install a compatible data logger and make the data from the wind turbine available on the Wind for Schools Web site so that other schools can access it for educational purposes
- Obtain all necessary funding to implement the project (the Wind for Schools program will offer some support in obtaining funds)
- Assume responsibility for all turbine maintenance and engage with all relevant organizations (such as the local utility or energy cooperative) that would support maintenance
- Conduct education and outreach to the local community
- Report on installation(s) and share data pertaining to system costs.

Program Expectations

The Wind for Schools program team expects that a school or school system interested in joining the affiliate program would engage in the following tasks:

- Incorporate the NEED Project's wind curricula into science classes



Photo credit: Andy Swapp/PIX14994

A Skystream wind turbine at Milford Elementary School in Milford, Utah.

If a school is unable to install a Wind for Schools system due to a lack of available land, permitting, or wind resource, the school may become an affiliate if staff members are interested in implementing the NEED Project's wind curricula and using data from other Wind for Schools system installations.

Expected Costs

An individual system, excluding staff time to cover the development costs, is approximately \$20,000 (this includes the turbine, tower, control package, and curricula). Operational funding for the system is not expected to be significant and would likely involve an annual inspection and the potential for minor service-related issues. The Wind for Schools program can assist in identifying funding sources but will not provide direct funding.

Application Process

School staff members interested in becoming a Wind for Schools K-12 affiliate should contact Ian Baring-Gould at (303) 384-7021 or ian.baring-gould@nrel.gov.

Statewide Wind for Schools Auxiliary Program

The statewide auxiliary program is designed to mirror the current Wind for Schools activities in other states. This includes implementing a WAC at a state-based university, creating a state facilitator position (if needed), and funding related program elements. The program goals would reflect those of the existing Wind for Schools program, including:

- Educating future wind applications personnel at universities
- Installing Wind for Schools systems at approximately five host K-12 schools per year
- Engaging with communities to convey the benefits and discuss the issues related to an expanded wind energy application.

Program Support

By agreeing to establish a state-based Wind for Schools auxiliary program, a state program will gain access to a broad array of support services, including:

- Project implementation documents, including interconnection specifications and foundation information
- National program-produced Wind for Schools publications
- Benefits of lessons learned by other states that have already implemented the program
- Hardware and software developed for the Wind for Schools system at costs equivalent to those charged to other Wind for Schools programs
- Limited technical assistance during the implementation of the Wind for Schools systems
- Program-sponsored meetings, training programs, and informational summits
- The Wind for Schools system database to support expanded educational opportunities
- The Wind for Schools environmental benefit sales process to allow the affiliate school to obtain outside funding to support the system implementation.

Program Expectations

A comprehensive, state-based Wind for Schools auxiliary program will be expected to:

- Provide funding and operational support to install a Wind for Schools system at the WAC to facilitate training and educational opportunities for WAC students at a college or university
- Identify funding for a state facilitator to work with the WAC and K-12 host schools on project implementation and integrate the state participants into the national Wind for Schools program
- Obtain all funding necessary to implement the program (some support for this process will be available through the national program on a case-by-case basis)
- Perform or promote education and outreach to local communities
- Purchase wind assessment/measurement systems to support resource assessments at schools (these systems are typically provided to the WAC and also provide an educational opportunity for students at the university or associated community colleges)
- Implement NEED-based teacher-training program(s)
- Purchase NEED curriculum kits for loan to K-12 host schools (typically through the WAC)
- Report installations and share data on system costs
- Attend national Wind for Schools summits and other related meetings



Photo credit: Judi Sigler/PIX16254

Installing a Wind for Schools system at the WAC facilitates training and educational opportunities for WAC students at a college or university.

- Provide partial funding or support for wind equipment at host schools
- Ensure that each host school activity meets the requirements as defined above for individual K-12 school programs.

Expected Costs

A fully comprehensive Wind for Schools state program including WAC, state facilitator, and initial equipment funding is approximately \$175,000 per year for 3 years.

This assumes that a small amount of the state funding, such as \$8,000 to \$10,000 per host school, will be applied to wind turbine hardware. Typical funding would include:

Wind Application Center:	\$60,000 / year
State facilitator:	\$30,000 / year
Host school system funding:	\$50,000 / year (assumes ~five systems per year)
State-based project oversight	\$10,000 / year
Meteorological towers	\$25,000 (first year)
Wind for Schools teacher training	\$25,000 (second and third years)



Photo credit: NexGen Energy Partners, LLC/PIX16741

Two 100-kW wind turbines, installed and operated by NexGen Energy Partners, provide on-site electricity generation for Upper Scioto Valley School in McGuffey, Ohio. Besides offsetting 20% of the school's energy bill, the turbines bring wind energy to life for students.

Application Process

Any state organization interested in hosting a Wind for Schools K-12 affiliate activity should contact Ian Baring-Gould at (303) 384-7021 or ian.baring-gould@nrel.gov.

Wind for Schools Equivalent Wind Systems

The Wind for Schools program has identified Southwest Windpower's Skystream 3.7 wind turbine as the primary turbine to be implemented at host K-12 schools. This turbine system was selected based on the following attributes:

- Manageable size (the nameplate power capacity of 2.4 kW is small enough to avoid a net-metering conflict with the local utility or power cooperative and to allow installation using local resources)
- Primary AC power production (ensures simple interconnection with a school's electrical systems)
- Guyed lattice and monopole tower options at multiple heights to ease installation

- Integrated data acquisition with Web-based monitoring capabilities
- Manageable total system cost that includes significant turbine price discounts from the manufacturer
- Proven company track record with a commitment to expand support for school-based wind systems and a nationwide support infrastructure to allow long-term installation, warranty, and maintenance support.

Other turbine technologies and sizes would be applicable, but they should be selected for their ability to meet the basic requirements listed above and to provide performance data for other Wind for Schools partners.



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1-877-EERE-INF (1-877-337-3463)
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Prepared by the National Renewable Energy Laboratory (NREL)
NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

DOE/GO-102009-2833 • December 2009